

Radiation Hard Electronics for Advanced Communication Systems, Phase II

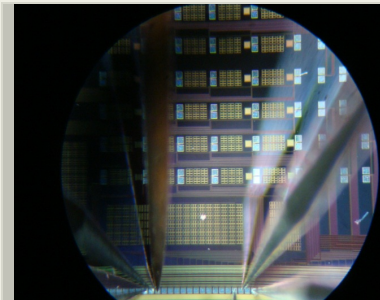
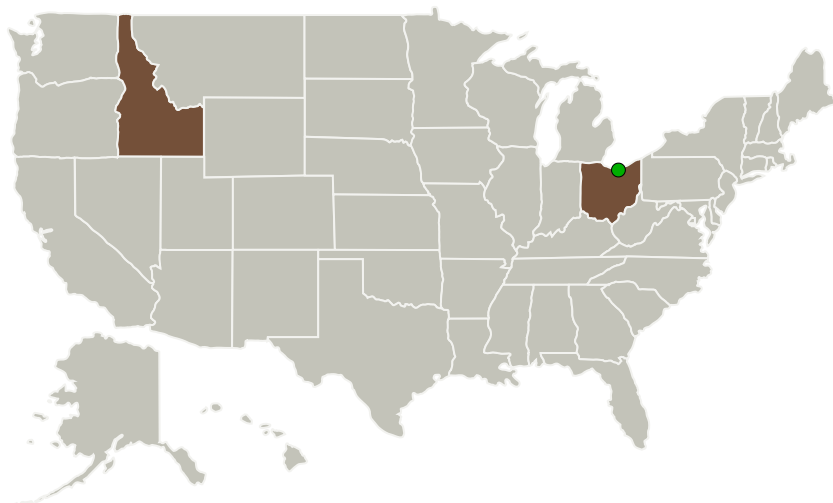
Completed Technology Project (2012 - 2014)



Project Introduction

Advanced reconfigurable/reprogrammable communication systems will require use of commercial sub 100 nm electronics. Legacy radiation tolerant circuits fail to provide Single Event Upset (SEU) immunity at speeds greater than 500 MHz. New base level logic circuits have been demonstrated in Phase I that provide SEU immunity for sub 100 nm high speed circuits. A completely new circuit and system approach called Self Recovery Logic (SRL) is proposed for development herein which is able to function at the full speed afforded by the fabrication process and able to tolerate SEU impacts not possible with legacy circuits. Moreover, a truly fault tolerant system is projected to replace Triple Modular Redundancy (TMR) as the on-chip means for fault tolerance. With the proposed building blocks in place, advanced reconfigurable and reprogrammable high speed devices can be implemented. The proposed work herein creates a robust test circuit for fabrication and radiation testing to prove conclusively that SRL is a superior technology and then to create an SRL synthesis library that can be used with commercial synthesis tools to create advanced communication systems.

Primary U.S. Work Locations and Key Partners



Radiation Hard Electronics for
Advanced Communication
Systems

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	3
Technology Areas	3
Target Destinations	3

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Organizations Performing Work	Role	Type	Location
Integrated Computer Solutions	Lead Organization	Industry	
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations

Idaho	Ohio
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Project Transitions

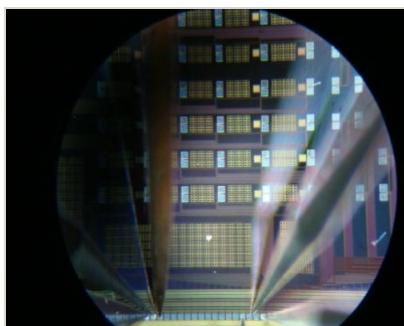
▶ **April 2012:** Project Start

✓ **April 2014:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138434>)

Images



Project Image

Radiation Hard Electronics for Advanced Communication Systems
(<https://techport.nasa.gov/image/136135>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Integrated Computer Solutions

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Sterling Whitaker

Co-Investigator:

Sterling Whitaker

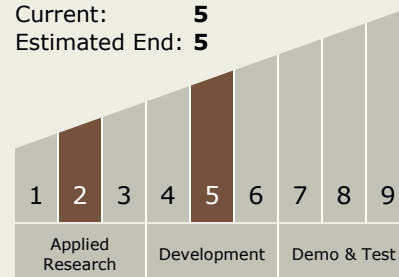
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Technology Maturity (TRL)

Start: 2
Current: 5
Estimated End: 5



Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
 - └ TX05.2 Radio Frequency
 - └ TX05.2.7 Innovative RF Technologies

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System